

IN THE CLAIMS:

1. (Currently Amended) A method of driving an active matrix display device wherein one image frame comprises a plurality of sub-frames each having a sub-frame period comprising a write time and a hold ~~time~~ time, and a gray scale ~~display is brought about~~ image is displayed on the device by the cumulative effect ~~effects~~ of the hold times, the method comprising ~~the steps of:~~

simultaneously with outputting a signal having ~~a value of a~~ signal level via each of signal lines, the value of the level of the signal level being selected from values of a plurality of signal levels in accordance with digital image data ~~and data,~~ the number of the plurality of signal levels being fewer than the number of ~~display gray scales,~~

randomly scanning scan lines ~~lines,~~ other than one predetermined scan line ~~line,~~ in a predetermined sequence ~~in~~ during the hold time of each of the sub-frames corresponding to the one predetermined scan

Serial No.: 09/936,172

line so that any one sub-frame is not written to any one scan line more than once;

wherein one image frame period is such that in each ~~respective~~ scan line, the writing of each of the plurality of sub-frames ~~is substantially brought about~~ occurs and the hold time of each of the sub-frames of said one image frame period ~~is ensured to bring about~~ sufficiently long enough to permit gray scale display driving.

2. (Currently Amended) A method of driving an active matrix display device wherein one image frame comprises a plurality of sub-frames SF1, SF2, ..., SFn, where n is a ~~natural number, an integer,~~ each sub-frame having a sub-frame period comprising a write time and a hold ~~time~~ time, and a gray scale ~~display is brought about~~ image is displayed on the device by the cumulative ~~effect~~ effects of the hold times, the method ~~comprising the steps of:~~

simultaneously with outputting a signal having ~~a value of a~~ signal level via each of signal lines, the value of the level of the signal level ~~being~~ selected from

Serial No.: 09/936,172

values of a plurality of signal levels in accordance with digital image data ~~and data,~~ the number of the plurality of signal levels being fewer than the number of display gray scales,

selecting scan lines so that a selection sequence of the periods of the sub-frames is repeated cyclically as in SF1→ SF2→ ...→ SFn→ SF1→ SF2→ ...→ SFn.

3. (Currently Amended) A method of driving an active matrix display device wherein one image frame comprises a plurality of sub-frames SF1, SF2, ..., SFn, where n is a ~~natural number,~~ an integer, each sub-frame having a sub-frame period comprising a write time and a hold ~~time~~ time, and a gray scale ~~display is brought about~~ image is displayed on the device by the cumulative effect ~~effects~~ of the hold times, the method comprising ~~the steps of:~~

simultaneously with outputting a signal ~~having a value of a~~ signal level via each of signal lines, the value of the level of the signal level being selected from values of a plurality of signal levels in accordance with digital image data ~~and data,~~ the number of the

Serial No.: 09/936,172

~~plurality of signal levels being fewer than the number of display gray scales,~~

selecting scan lines so that a selection sequence of the periods of the sub-frames is repeated cyclically as in SF1→ SF2→ ...→ SFn→ SF1→ SF2→ ...→ SFn and sequential scanning ~~is brought about~~ occurs with respect to each of the sub-frame periods.

4. (Currently Amended) A method of driving an active matrix display device wherein one image frame having a frame period comprises a plurality of sub-frames each comprising a write time and a hold ~~time time,~~ and a gray scale ~~display is brought about~~ image is displayed on the device by the cumulative ~~effect effects~~ of the hold times, the method comprising ~~the steps of:~~

simultaneously with outputting a signal ~~having a value of a signal level~~ via each of signal lines, the value of the level of the signal level being selected from values of a plurality of signal levels in accordance with digital image ~~data and data,~~ the number of the

Serial No.: 09/936,172

~~plurality of signal levels being fewer than the number of display gray scales,~~
driving the display device such that the period of the frame is set to

$$NH[1 + K(2^N - 1)] = NHL$$

where N is the number of sub-frames, H is a horizontal scanning period, $1:2:4:\dots:2^{N-1}$ is the weightings of the hold times, L is the number of scan lines, and K is a positive integer.

5. (Currently Amended) A method of driving an active matrix display device wherein one image frame having a frame period comprises a plurality of sub-frames each comprising a write time and a hold ~~time~~ time, and a gray scale display is ~~brought about~~ image is displayed on the device by the cumulative effect of the hold times, the method comprising ~~the steps of:~~

simultaneously with outputting a signal having ~~a value of a signal level~~ via each of signal lines, the value of the level of the signal level being selected from values of a plurality of signal levels in accordance

Serial No.: 09/936,172

with digital image data ~~and data,~~ the number of the plurality of signal levels being fewer than the number of display gray scales, driving the display device such that the period of the frame is set to

$$\cancel{NH[1 - \sum K(i)] = NHL}$$

$$\underline{NH[1 + \sum K(i)] = NHL}$$

where N is the number of sub-frames, H is a horizontal scanning period, K(i) is the weighting of the hold time of the period of an ith sub-frame where $i=1,2,\dots$, N, and L is the number of scan lines.

6. (Currently Amended) A method of driving an active matrix display device wherein one image frame having a frame period comprises a plurality of sub-frames each comprising a write time and a hold ~~time~~ time, and a gray scale ~~display is brought about~~ image is displayed on the device by the cumulative ~~effect~~ effects of the hold times, the method comprising ~~the steps of:~~

Serial No.: 09/936,172

simultaneously with outputting a signal ~~having a value of a~~
~~signal level via~~ each of signal lines, the value of
the level of the signal level being selected from
values of a plurality of signal levels in accordance
with digital image data ~~and data,~~ the number of the
~~plurality of~~ signal levels being at least three and
fewer than the number of ~~display gray~~ scales, making
two the degree of freedom of the signal levels usable
for one gray scale within the period of the one frame.

7. (Original) A method of driving an active matrix display device according to claim 1, wherein the number of the values of the plurality of signal levels is two.

8. (Original) A method of driving an active matrix display device according to claim 2, wherein the number of the values of the plurality of signal levels is two.

9. (Original) A method of driving an active matrix display device according to claim 3, wherein the number of the values of the plurality of signal levels is two.

Serial No.: 09/936,172

10. (Original) A method of driving an active matrix display device according to claim 4, wherein the number of the values of the plurality of signal levels is two.

11. (Original) A method of driving an active matrix display device according to claim 5, wherein the number of the values of the plurality of signal levels is two.

12. (Currently Amended) A method of driving an active matrix display device according to claim 1, wherein the number of the values of the plurality of signal levels is ~~a plurality of at least three or more~~.

13. (Currently Amended) A method of driving an active matrix display device according to claim 2, wherein the number of the values of the plurality of signal levels is ~~a plurality of at least three or more~~.

14. (Currently Amended) A method of driving an active matrix display device according to claim 3, wherein the number of the values of the plurality of signal levels is ~~a plurality of at least three or more~~.

Serial No.: 09/936,172

15. (Currently Amended) A method of driving an active matrix display device according to claim 4, wherein the number of the values of the plurality of signal levels is ~~a plurality of at least three or more.~~

16. (Currently Amended) A method of driving an active matrix display device according to claim 5, wherein the number of the values of the plurality of signal levels is ~~a plurality of at least three or more.~~

17. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a liquid crystal layer therebetween, the first substrate having formed thereon switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, pixel electrodes connected to the switching elements, and storage capacitors connected to the pixel electrodes and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each having a sub-frame period comprising a write time and a hold

Serial No.: 09/936,172

~~time~~ time, and a gray ~~seale~~ scale, ~~display is brought about is~~
displayed on the device by the cumulative ~~effect~~ effects of the
hold times, the display device comprising:

a signal line driver circuit for selecting a value of a
voltage level from values of a plurality of voltage
levels in accordance with digital image data and
outputting a voltage having the selected value via
each of the signal lines, the number of the plurality
of voltage levels being fewer than the number of
display gray scales; and

a scan line driver circuit for randomly scanning the
plurality of scan lines by scanning scan ~~lines~~ lines,
other than one predetermined scan ~~line~~ line, in a
predetermined sequence ~~in~~ during the hold time of each
of the sub-frames corresponding to the one
predetermined scan so that any one sub-frame is not
written to any one scan line more than once;

wherein one image frame period is such that in each
respective scan line, the writing of each of the
plurality of sub-frames ~~is substantially brought about~~

Serial No.: 09/936,172

occurs and the hold time of each of the ~~sub-frames~~ of
said one image frame period ~~is ensured to bring about~~
is sufficiently long enough to permit gray scale
display driving.

18. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a liquid crystal layer therebetween, the first substrate having formed thereon switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, pixel electrodes connected to the switching elements, and storage capacitors connected to the pixel electrodes and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames SF1, SF2, ..., SFn, where n is ~~a natural number,~~ an integer, each sub-frame having a sub-frame period comprising a ~~write time-time,~~ and a ~~hold time-time,~~ and a ~~gray scale display is brought about~~ scale, is displayed on the device by the cumulative effect effects of the hold times, the display device comprising:

Serial No.: 09/936,172

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality of voltage levels being fewer than the number of display gray scales; and

a scan line driver circuit for selecting the scan lines so that a selection sequence of the periods of the subframes is repeated cyclically as in SF1→ SF2→ ...→ SFn→ SF1→ SF2→ ...→ SFn.

19. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a liquid crystal layer therebetween, the first substrate having formed thereon switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, pixel electrodes connected to the switching elements, and storage capacitors connected to the pixel electrodes and the second substrate having formed thereon a counter electrode,

Serial No.: 09/936,172

wherein one image frame comprises a plurality of sub-frames SF1, SF2, ..., SFn, where n is a ~~natural number~~, an integer each sub-frame having a sub-frame period comprising a write time and a ~~hold time time~~, and a ~~gray scale display is brought about scale~~, is displayed on the device by the cumulative effect ~~effects~~ of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality of voltage levels being fewer than the number of display gray scales; and

a scan line driver circuit for selecting the scan lines so that a selection sequence of the periods of the sub-frames is repeated cyclically as in SF1→ SF2→ ...→ SFn→ SF1→ SF2→ ...→ SFn and sequential scanning is brought about with respect to each of the sub-frame periods.

Serial No.: 09/936,172

20. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a liquid crystal layer therebetween, the first substrate having formed thereon switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, pixel electrodes connected to the switching elements, and storage capacitors connected to the pixel electrodes and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each comprising a write time and a hold ~~time~~ time, and a gray scale ~~display is brought about~~ scale, is displayed on the device by the cumulative effect ~~effects~~ of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality

Serial No.: 09/936,172

of voltage levels being fewer than the number of display gray scales; and
a scan line driver circuit for selecting the scan lines so that the period of the frame is

$$NH[1 + K(2^N - 1)] = NHL$$

where N is the number of sub-frames, H is a horizontal scanning period, $1:2:4:\dots:2^{N-1}$ is the weightings of the hold times, L is the number of scan lines, and K is a positive integer.

21. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a liquid crystal layer therebetween, the first substrate having formed thereon switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, pixel electrodes connected to the switching elements, and storage capacitors connected to the pixel electrodes and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each

Serial No.: 09/936,172

having a sub-frame period comprising a write time and a hold
time time, and a gray scale display is brought about scale, is
displayed on the device by the cumulative effect-effects of the
hold times, the display device comprising:

a signal line driver circuit for selecting a value of a
voltage level from values of a plurality of voltage
levels in accordance with digital image data and
outputting a voltage having the selected value via
each of the signal lines, the number of the plurality
of voltage levels being fewer than the number of
display gray scales; and

a scan line driver circuit for selecting the scan lines so
that the period of the frame is

$$\cancel{NH[1 - \sum K(i)] = NHL}$$

$$\underline{NH[1 + \sum K(i)] = NHL}$$

where N is the number of sub-frames, H is a horizontal
scanning period, K(i) is the weighting of the hold
time of the period of an ith sub-frame where $i=1,2,\dots,$
N, and L is the number of scan lines.

22. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a liquid crystal layer therebetween, the first substrate having formed thereon switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, pixel electrodes connected to the switching elements, and storage capacitors connected to the pixel electrodes and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each comprising a write time and a hold ~~time~~ time, and a gray scale ~~display is brought about~~ scale, is displayed on the device by the cumulative effect of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality of voltage levels being at least three and fewer than

Serial No.: 09/936,172

the number of display gray scales and the selection being carried out so that the degree of freedom of the voltage levels usable for one gray scale within the period of the one frame is two; and
a scan line driver circuit for sequentially scanning or randomly scanning the scan lines.

23. (Original) An active matrix display device according to claim 17, wherein the number of the values of the plurality of voltage levels is two.

24. (Original) An active matrix display device according to claim 18, wherein the number of the values of the plurality of voltage levels is two.

25. (Original) An active matrix display device according to claim 19, wherein the number of the values of the plurality of voltage levels is two.

26. (Original) An active matrix display device according to claim 20, wherein the number of the values of the plurality of voltage levels is two.

Serial No.: 09/936,172

27. (Original) An active matrix display device according to claim 21, wherein the number of the values of the plurality of voltage levels is two.

28. (Currently Amended) An active matrix display device according to claim 17, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

29. (Currently Amended) An active matrix display device according to claim 18, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

30. (Currently Amended) An active matrix display device according to claim 19, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

31. (Currently Amended) An active matrix display device according to claim 20, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

32. (Currently Amended) An active matrix display device according to claim 21, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

33. (Original) An active matrix display device according to claim 17, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

34. (Original) An active matrix display device according to claim 18, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level

Serial No.: 09/936,172

selected from the plurality of voltage levels and outputting a voltage having the selected one value.

35. (Original) An active matrix display device according to claim 19, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

36. (Original) An active matrix display device according to claim 20, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

37. (Original) An active matrix display device according to claim 21, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

Serial No.: 09/936,172

38. (Original) An active matrix display device according to claim 22, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

39. (Original) An active matrix display device according to claim 17, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

40. (Original) An active matrix display device according to claim 18, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

41. (Original) An active matrix display device according to claim 19, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

Serial No.: 09/936,172

42. (Original) An active matrix display device according to claim 20, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

43. (Original) An active matrix display device according to claim 21, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

44. (Original) An active matrix display device according to claim 22, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

45. (Original) An active matrix display device according to claim 17, wherein each of the switching elements comprises a three-terminal thin film transistor.

46. (Original) An active matrix display device according to claim 18, wherein each of the switching elements comprises a three-terminal thin film transistor.

Serial No.: 09/936,172

47. (Original) An active matrix display device according to claim 19, wherein each of the switching elements comprises a three-terminal thin film transistor.

48. (Original) An active matrix display device according to claim 20, wherein each of the switching elements comprises a three-terminal thin film transistor.

49. (Original) An active matrix display device according to claim 21, wherein each of the switching elements comprises a three-terminal thin film transistor.

50. (Original) An active matrix display device according to claim 22, wherein each of the switching elements comprises a three-terminal thin film transistor.

51. (Currently Amended) An active matrix display device according to claim 17, wherein the counter electrode is for being driven by inversion driving according to a cycle of an integral multiple of a horizontal scanning period, the driving being synchronized with output signals from the signal line driver circuit.

Serial No.: 09/936,172

52. (Currently Amended) An active matrix display device according to claim 18, wherein the counter electrode is for being driven by inversion driving according to a cycle of an integral multiple of a horizontal scanning period, the driving being synchronized with output signals from the signal line driver circuit.

53. (Currently Amended) An active matrix display device according to claim 19, wherein the counter electrode is for being driven by inversion driving according to a cycle of an integral multiple of a horizontal scanning period, the driving being synchronized with output signals from the signal line driver circuit.

54. (Currently Amended) An active matrix display device according to claim 20, wherein the counter electrode is for being driven by inversion driving according to a cycle of an integral multiple of a horizontal scanning period, the driving being synchronized with output signals from the signal line driver circuit.

Serial No.: 09/936,172

55. (Currently Amended) An active matrix display device according to claim 21, wherein the counter electrode is for being driven by inversion driving according to a cycle of an integral multiple of a horizontal scanning period, the driving being synchronized with output signals from the signal line driver circuit.

56. (Currently Amended) An active matrix display device according to claim 22, wherein the counter electrode is for being driven by inversion driving according to a cycle of an integral multiple of a horizontal scanning period, the driving being synchronized with output signals from the signal line driver circuit.

57. (Currently Amended) An active matrix display device according to claim 17, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected from~~ four values to carry out capacitively coupled driving.

Serial No.: 09/936,172

58. (Currently Amended) An active matrix display device according to claim 18, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from four values to carry out capacitively coupled driving.

59. (Currently Amended) An active matrix display device according to claim 19, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from four values to carry out capacitively coupled driving.

60. (Currently Amended) An active matrix display device according to claim 20, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from four values to carry out capacitively coupled driving.

61. (Currently Amended) An active matrix display device according to claim 21, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are

Serial No.: 09/936,172

~~selected~~ from four values to carry out capacitively coupled driving.

62. (Currently Amended) An active matrix display device according to claim 22, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from four values to carry out capacitively coupled driving.

63. (Currently Amended) An active matrix display device according to claim 17, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from two values and the storage capacitors are independently driven with two values to carry out capacitively coupled driving.

64. (Currently Amended) An active matrix display device according to claim 18, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from two values and the storage capacitors are

Serial No.: 09/936,172

independently driven with two values to carry out capacitively coupled driving.

65. (Currently Amended) An active matrix display device according to claim 19, wherein further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from two values and the storage capacitors are independently driven with two values to carry out capacitively coupled driving.

66. (Currently Amended) An active matrix display device according to claim 20, wherein further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from two values and the storage capacitors are independently driven with two values to carry out capacitively coupled driving.

67. (Currently Amended) An active matrix display device according to claim 21, wherein further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from two values and the storage capacitors are

Serial No.: 09/936,172

independently driven with two values to carry out capacitively coupled driving.

68. (Currently Amended) An active matrix display device according to claim 22, ~~wherein~~ further comprising a driver for selecting outputs supplied from the scan line driver circuit are ~~selected~~ from two values and the storage capacitors are independently driven with two values to carry out capacitively coupled driving.

69. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a luminescent layer therebetween, the first substrate having formed thereon first switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, second switching elements connected to the first switching elements, pixel electrodes connected to the second switching elements, and power supply lines connected to a side of the second switching elements differing from that to which the pixel electrodes are connected and the second substrate having formed

Serial No.: 09/936,172

thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each having a sub-frame period comprising a write time and a hold ~~time~~time, and a gray scale ~~display is brought about~~scale, is displayed on the device by the cumulative effect ~~effects~~ of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality of voltage levels being fewer than the number of display gray scales; and

a scan line driver circuit for randomly scanning the plurality of scan lines by scanning scan ~~lines~~lines, other than one predetermined scan ~~line~~line, in a predetermined sequence ~~in~~during the hold time of each of the sub-frames corresponding to the one predetermined scan so that any one sub-frame is not written to any one scan line more than once;

wherein one image frame period is such that in each respective scan line, the writing of each of the plurality of sub-frames ~~is substantially brought about~~ occurs and the hold time of each of ~~the sub-frames~~ of said one range frame period ~~is ensured to bring about~~ is sufficiently long enough to permit gray scale display driving.

70. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a luminescent layer therebetween, the first substrate having formed thereon first switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, second switching elements connected to the first switching elements, pixel electrodes connected to the second switching elements, and power supply lines connected to a side of the second switching elements differing from that to which the pixel electrodes are connected and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames SF1, SF2, ..., SFn, where n is a ~~natural~~

Serial No.: 09/936,172

~~number, an integer, each sub-frame having a sub-frame period~~
comprising a write time and a hold ~~time~~ time, and a gray scale
~~display is brought about~~ scale, is displayed on the device by
the cumulative effect ~~effects~~ of the hold times, the display
device comprising:

a signal line driver circuit for selecting a value of a
voltage level from values of a plurality of voltage
levels in accordance with digital image data and
outputting a voltage having the selected value via
each of the signal lines, the number of the plurality
of voltage levels being fewer than the number of
display gray scales; and

a scan line driver circuit for selecting the scan lines so
that a selection sequence of the periods of the sub-
frames is repeated cyclically as in SF1→ SF2→ ...→ SFn→
SF1→ SF2→ ...→ SFn.

71. (Currently Amended) An active matrix display device
including a first substrate and a second substrate confronting
the first substrate with a luminescent layer therebetween, the
first substrate having formed thereon first switching elements

Serial No.: 09/936,172

corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, second switching elements connected to the first switching elements, pixel electrodes connected to the second switching elements, and power supply lines connected to a side of the second switching elements differing from that to which the pixel electrodes are connected and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames SF1, SF2, ..., SFn, where n is a ~~natural number~~, an integer, each sub-frame having a sub-frame period comprising a write time and a hold ~~time~~ time, and a gray scale ~~display is brought about~~ scale, is displayed on the device by the cumulative effect ~~effects~~ of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality

Serial No.: 09/936,172

of voltage levels being fewer than the number of display gray scales; and

a scan line driver circuit for selecting the scan lines so that a selection sequence of the periods of the sub-frames is repeated cyclically as in SF1→ SF2→ ...→ SFn→ SF1→ SF2→ ...→ SFn and sequential scanning is brought about with respect to each of the sub-frame periods.

72. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a luminescent layer therebetween, the first substrate having formed thereon first switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, second switching elements connected to the first switching elements, pixel electrodes connected to the second switching elements, and power supply lines connected to a side of the second switching elements differing from that to which the pixel electrodes are connected and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each comprising a write time and a hold

Serial No.: 09/936,172

~~time-time,~~ and a gray scale display is brought about scale, is displayed on the device by the cumulative effect ~~effects~~ of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality of voltage levels being fewer than the number of display gray scales; and

a scan line driver circuit for selecting the scan lines so that the period of the frame is

$$NH[1 + K(2^N - 1)] = NHL$$

where N is the number of sub-frames, H is a horizontal scanning period, 1:2:4:...:2^{N-1} is the weightings of the hold times, L is the number of scan lines, and K is a positive integer.

73. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting

Serial No.: 09/936,172

the first substrate with a luminescent layer therebetween, the first substrate having formed thereon first switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, second switching elements connected to the first switching elements, pixel electrodes connected to the second switching elements, and power supply lines connected to a side of the second switching elements differing from that to which the pixel electrodes are connected and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each comprising a write time and a hold ~~time~~ time, and a gray ~~scale display is brought about~~ scale, is displayed on the device by the cumulative ~~effect~~ effects of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality

Serial No.: 09/936,172

of voltage levels being fewer than the number of display gray scales; and
a scan line driver circuit for selecting the scan lines so that the period of the frame is

$$\cancel{NH[1 - \sum K(i)] = NHL}$$

$$\underline{NH[1 + \sum K(i)] = NHL}$$

where N is the number of sub-frames, H is a horizontal scanning period, K(i) is the weighting of the hold time of the period of an ith sub-frame where i=1,2,..., N, and L is the number of scan lines.

74. (Currently Amended) An active matrix display device including a first substrate and a second substrate confronting the first substrate with a luminescent layer therebetween, the first substrate having formed thereon first switching elements corresponding to the intersection points of a plurality of signal lines and a plurality of scan lines arranged in a matrix, second switching elements connected to the first switching elements, pixel electrodes connected to the second switching elements, and power supply lines connected to a side of the

Serial No.: 09/936,172

second switching elements differing from that to which the pixel electrodes are connected and the second substrate having formed thereon a counter electrode, wherein one image frame comprises a plurality of sub-frames each comprising a write time and a hold ~~time time,~~ and a gray scale display is brought about scale, is displayed on the device by the cumulative effect of the hold times, the display device comprising:

a signal line driver circuit for selecting a value of a voltage level from values of a plurality of voltage levels in accordance with digital image data and outputting a voltage having the selected value via each of the signal lines, the number of the plurality of voltage levels being at least three and fewer than the number of display gray scales and the selection being carried out so that the degree of freedom of the voltage levels usable for one gray scale within the period of the one frame is two; and

a scan line driver circuit for sequentially scanning or randomly scanning the scan lines.

Serial No.: 09/936,172

75. (Original) An active matrix display device according to claim 69, wherein the number of the values of the plurality of voltage levels is two.

76. (Original) An active matrix display device according to claim 70, wherein the number of the values of the plurality of voltage levels is two.

77. (Original) An active matrix display device according to claim 71, wherein the number of the values of the plurality of voltage levels is two.

78. (Original) An active matrix display device according to claim 72, wherein the number of the values of the plurality of voltage levels is two.

79. (Original) An active matrix display device according to claim 73, wherein the number of the values of the plurality of voltage levels is two.

Serial No.: 09/936,172

80. (Currently Amended) An active matrix display device according to claim 69, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

81. (Currently Amended) An active matrix display device according to claim 70, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

82. (Currently Amended) An active matrix display device according to claim 71, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

83. (Currently Amended) An active matrix display device according to claim 72, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

Serial No.: 09/936,172

84. (Currently Amended) An active matrix display device according to claim 73, wherein the number of the values of the plurality of voltage levels is ~~a plurality of~~ at least three ~~or more~~.

85. (Original) An active matrix display device according to claim 69, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

86. (Original) An active matrix display device according to claim 70, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

87. (Original) An active matrix display device according to claim 71, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level

Serial No.: 09/936,172

selected from the plurality of voltage levels and outputting a voltage having the selected one value.

88. (Original) An active matrix display device according to claim 72, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

89. (Original) An active matrix display device according to claim 73, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

90. (Original) An active matrix display device according to claim 74, wherein the signal line driver circuit comprises an analog multiplexer for selecting one value of a voltage level selected from the plurality of voltage levels and outputting a voltage having the selected one value.

Serial No.: 09/936,172

91. (Original) An active matrix display device according to claim 69, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

92. (Original) An active matrix display device according to claim 70, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

93. (Original) An active matrix display device according to claim 71, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

94. (Original) An active matrix display device according to claim 72, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

Serial No.: 09/936,172

95. (Original) An active matrix display device according to claim 73, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

96. (Original) An active matrix display device according to claim 74, wherein the scan line driver circuit comprises a decoder for selecting the scan lines in accordance with inputted address signals.

97. (Original) An active matrix display device according to claim 69, wherein each of the first switching elements and the second switching elements comprises a three-terminal thin film transistor.

98. (Original) An active matrix display device according to claim 70, wherein each of the first switching elements and the second switching elements comprises a three-terminal thin film transistor.

Serial No.: 09/936,172

99. (Original) An active matrix display device according to claim 71, wherein each of the first switching elements and the second switching elements comprises a three-terminal thin film transistor.

100. (Original) An active matrix display device according to claim 72, wherein each of the first switching elements and the second switching elements comprises a three-terminal thin film transistor.

101. (Original) An active matrix display device according to claim 73, wherein each of the first switching elements and the second switching elements comprises a three-terminal thin film transistor.

102. (Original) An active matrix display device according to claim 74, wherein each of the first switching elements and the second switching elements comprises a three-terminal thin film transistor.